Clarius+ Version 1.5

Software Release Notes & Installation Instructions

Important information

The 4200A-SCS Clarius+ software application suite is a release of the software for the 4200A-SCS. Clarius+ software requires **Microsoft® Windows® 10** to be installed on your 4200A-SCS Parameter Analyzer.

Introduction

This document provides supplemental information regarding the behavior of Clarius+ software. This information is grouped into six categories:

Revision history	Lists the version of software, the document version, and the date of the software release.
New features / enhancements	Summary of each significant new feature included in Clarius+ software and the 4200A-SCS.
Problem fixes	Summary of each significant software/firmware bug fix in Clarius+ software and the 4200A-SCS.
Known problems	Description of each significant known problem and ways to work around it.
Usage notes	Helpful information describing how to optimize the performance of Clarius+ software and the 4200A-SCS.
Installation instructions	Detailed instructions describing how to install all software components, firmware, and help files.

Revision history

This document is periodically updated and distributed with releases and service packs to provide the most up-to-date information. This revision history is included below.

Date	Software version	Document number	Version
6/8/2018	V1.5	0771326	06
2/23/2018	V1.4.1	0771326	05
11/30/2017	V1.4	0771326	04
5/08/2017	V1.3	0771326	03
3/24/2017	V1.2	0771326	02
10/31/2016	V1.1	0771326	01
9/1/2016	V1.0	0771326	00

New features/enhancements

Issue number	SCS-3355, SCS-3779
Subsystem	Clarius, 4210-CVU
Enhancement	Added a new operation mode for the 4210-CVU to Sweep DC while Stepping Frequency.

Issue number	SCS-3374
Subsystem	Clarius
Enhancement	Added a Gate Charge test (gate-charge) to the Clarius library.

Issue number	SCS-3577 / AR60564
Subsystem	Clarius
Enhancement	When changing a run name (e.g. Run5) in the Clarius Analyze view, the new name is now used in the following locations: —Data grid tab name in Analyze view —Graph (legend, data variable names, and graph configuration dialogs) —Data grid Settings sheet (List of selected runs to select settings for desired run) —Formulator dialog (List of selected runs to select formulas for desired run) —If the data grid is saved to an Excel file using the Save Data dialog in Analyze view then the new name will also be used in the Excel tab name and the Settings sheet. —The new name will also will be preserved if the test is added to the test library. If the new name is cleared then all names for the run will be set back to the original name (e.g. Run5). Custom name limitations: —Name length is limited to 19 characters. —Clarius will not allow runs to have the same name. Comparison is not case sensitive, meaning Best and best are the same name. If name duplication is detected then an error message will be shown and the name will be rolled back to its value before modifications. —Clarius prevents use of the following reserved names as custom names: "Data", "Calc", "Settings", "Run1","Run2",..."Run345",... If this occurs then an error message will be shown and the name will be rolled back to its value before modifications.

Issue number	SCS-3655
Subsystem	Clarius
Enhancement	The Clarius Message Console performance has been improved making message logging faster.

Issue number	SCS-3693
Subsystem	Reset Hardware
Enhancement	The 4200A-CVIV module has been added to the Reset Hardware tool.

Issue number	SCS-3723, SCS-3724, SCS-3802
Subsystem	KCON
Enhancement	Added support for the Field Installable Units options: 4200-SMU-R, 4210-SMU-R, 4200-SMU/PA-R, and 4210-SMU/PA-R.

Issue number	SCS-3728
Subsystem	Clarius
Enhancement	Added the following two tests to the Clarius Library: —van der Pauw Volume Resistivity Measurement (vdp-volume-resistivity) —van der Pauw Surface Resistivity Measurement (vdp-surface-resistivity)

Issue number	SCS-3730, SCS-3803
Subsystem	Clarius
Enhancement	Added mutli-segment sweep functionality, allowing multiple stop points and step sizes to be specified for a sweep operation.
Issue number	SCS-3736
Subsystem	Datasheet
Enhancement	4200A-CVIV 3-terminal bias tee specifications have been added to the 4200A-SCS datasheet.
Issue number	SCS-3739
Subsystem	Clarius
Enhancement	Added a Gate Charge user library to Clarius.
Issue number	SCS-3740
Subsystem	Clarius
Enhancement	Added a Van der Pauw user library to Clarius.
Issue number	SCS-3747
Subsystem	KXCI
Enhancement	A 64-bit version of the KXCI client driver used to control KXCI through the ethernet is now provided, in addition to the existing 32-bit version. You can copy this driver to your controlling computer. The DLL is standalone. It does not depend on any other DLLs, so it can be easily moved or copied.
	This driver DLL is named KXCIclient64.dll and is at the command path: C:\s4200\sys\bin
	The KXCIclient64.lib is at the command path: C:\s4200\sys\lib
Issue number	SCS-3784
Subsystem	Clarius
Enhancement	Added MOSFET C-V Sweep, Step Frequency (cvsweep-stepf) test to the Clarius library.
Issue number	SCS-3795
Subsystem	Learning Center
Enhancement	The "Using the 4200A-CVIV Multi-Switch to Make High Voltage and High Current C-V Measurements" Application Note has been added to the Learning Center.
Issue number	SCS-3800
Subsystem	Manuals
Enhancement	A table explaining the different CVIV configuration modes has been added to the *Model 4200A-CVIV User's Manual.*
Issue number	SCS-3801, SCS-3895
Subsystem	Clarius
Enhancement	Added MOSFET 3-Terminal C-V Tests Using 4200A-CVIV Bias Tees (mosfet-cviv-cv-bias-tees) project to the Clarius library.
Issue number	SCS-3815
Subsystem	Clarius
Enhancement	Added the Gate Charge Project (gate-charge) to the Clarius library.

Issue number	SCS-3817
Subsystem	Clarius
Enhancement	Added 2D FET Drain Current versus Gate Voltage (2dfet-id-vg) test to the Clarius library.

Issue number	SCS-3820
Subsystem	Learning Center
Enhancement	The "Measuring MOSFET Gate Charge with the 4200A-SCS Parameter Analyzer" application note has been added to the Learning Center.

Issue number	SCS-3839
Subsystem	Learning Center
Enhancement	Added "Keithley Instrumentation for Electrochemical Test Methods and Applications" application note to Learning Center.

Issue number	SCS-3896
Subsystem	System
Enhancement	The factory backup restore software provided with new production systems has been updated to Acronis True Image 2018.

Problem fixes

Issue number	SCS-301
Subsystem	Clarius
Symptom	Clarius can become unstable resulting in a crash if the following sequence is performed: 1. Delete All within the Run History is performed on a selected test and the current site is not Site 1. 2. The selected test is now immediately run. Note selecting a different test and returning to the original test before running will not cause Clarius to become unstable.
Resolution	This issue has been corrected.

Issue number	SCS-471
Subsystem	Clarius
Symptom	Long tests with excessive logging can slow down measurements as the test proceeds.
Workaround	Reduce the number of log messages by correcting errors in custom UTMs.
Resolution	This issue has been corrected.

Issue number	SCS-798
Subsystem	Clarius
Symptom	Using a large "Number of Sites" value causes Clarius to crash when selecting the "Segment Stress" subsite mode.
Resolution	This issue has been corrected. The maximum number of sites is now limited to 999.

Issue number	SCS-841
Subsystem	Clarius
Symptom	After disabling dual graph mode, newly unchecked runs will persist on the graph.
Resolution	This issue has been corrected.

Issue number	SCS-910
Subsystem	Clarius
Symptom	When a UTM includes an output of type "char *" and too many characters are placed into that array, Clarius may become unresponsive.
Resolution	This issue has been corrected.
Issue number	SCS-3598
Subsystem	Clarius
Symptom	Under certain conditions, with excessively large data being reported to the message console, Clarius could crash.
Resolution	This issue has been corrected.
Issue number	SCS-3654
Subsystem	Clarius
Symptom	The PMU_1Chan_Waveform_Example user module in the PMU_Examples_ulib user library will hang when the maximum number of samples allowed is exceeded.
Resolution	This issue has been corrected.
Issue number	SCS-3663
Subsystem	Clarius
Symptom	By default, the CVU measure parameters are Cp-Gp. However, the measure parameters can be changed in the Advanced Terminal Settings window in the Configure View to other parameters such as Z, Theta. If the measure parameters are updated and then the Analyze Sheet is selected, the column names will change to the desired measured parameters, however the actual data doesn't update. The data that is displayed is from the previously selected measured parameters.
Resolution	This issue has been corrected.
Issue number	SCS-3688
Subsystem	Clarius
Symptom	If a Clarius project's permissions are changed to read-only through the Windows property settings, opening that project will cause Clarius to crash.
Resolution	This issue has been corrected.
Issue number	SCS-3697 / AR60605
Subsystem	Clarius
Symptom	In certain test configurations, SMU UTM current measurements may incorrectly return 7E22. Specifically, the problem will only occur for a UTM using a SMU with Preamp on a current measure range of Auto or Limited Auto and with compliance set to 1e-6 A or lower.
Resolution	This issue has been corrected.

Issue number	SCS-3709
Subsystem	4200A-CVIV, Firmware Upgrade
Symptom	4200A-CVIV firmware upgrades intermittently fail.
Workaround	Re-run the firmware upgrade.
Resolution	This issue has been corrected.
Issue number	SCS-3715
Subsystem	Installation
Symptom	Errors reported during some PC installations due to incompatibilities with previously installed Microsoft Visual C++ Redistributables
Resolution	This issue has been corrected.
Issue number	SCS-3717
Subsystem	Clarius
Symptom	The Clarius Subsite Configuration pane fails to resize properly when the Project Tree pane is collapsed using the "<" button in upper left corner of the Project Tree pane.
Resolution	This issue has been corrected.
Issue number	SCS-3741
Subsystem	KCon
Symptom	The "Update Preamp, RPM, and CVIV Configuration" feature in KCON did not enforce the required pairing of SMUs to their calibrated Preamp partners, or PMUs to their calibrated RPM partners.
Resolution	This issue has been corrected.
Issue number	SCS-3745
Subsystem	Clarius
Symptom	Clarius crashes if user opens Formulator for a UTM while in Configuration view.
Resolution	This issue has been corrected.
Issue number	SCS-3752
Subsystem	Clarius, KXCI
Symptom	Under certain conditions, the CVU may return NaN (not a number) readings. Specifically, this could occur the first time a CVU was used from Clarius after a calibration, or whenever there were multiple CVUs installed in a system.
Resolution	This issue has been corrected.
Issue number	SCS-3757 / AR60865
Subsystem	Clarius
Symptom	The chargepumping user library's modules may not initialize the PMU, resulting in an error.
Resolution	This issue has been corrected.

Issue number	SCS-3764 / AR6111
Subsystem	Clarius
Symptom	When configuring the CVU in Sampling Mode, the DC Bias is always zero regardless of the specified value.
Resolution	This issue has been corrected.
Issue number	SCS-3766
Subsystem	Clarius
Symptom	Internal timing settings for the Clarius help pane could cause timeouts in certain situations, preventing help information from displaying and causing sluggish button responses.
Resolution	This issue has been corrected.
Issue number	SCS-3768
Subsystem	Learning Center
Symptom	The Learning Center maps the "Using the 4200-CVU-PWR C-V Power Package to Make High Voltage and High Current C-V Measurements with the 4200A-SCS Parameter Analyzer" application note to the wrong document.
Resolution	This issue has been corrected.
Issue number	SCS-3771 / AR6111
Subsystem	Clarius
Symptom	When the system configuration includes a CVU card without any PMU cards, CVU Sampling Mode does not work.
Resolution	This issue has been corrected.
Issue number	SCS-3776
Subsystem	Clarius
Symptom	Changing CVU Measure Parameters causes loss of DCV and frequency data.
Resolution	This issue has been corrected.
Issue number	SCS-3791
Subsystem	KCON, KXCI
Symptom	In KCON's KXCI Settings window, the Reading Delimiter and Character settings are incorrectly disabled while in Ethernet mode.
Workaround	Switch from Ethernet mode to GPIB mode, change settings, then switch back to Ethernet mode.
Resolution	This issue has been corrected.
Issue number	SCS-3794
Subsystem	Clarius
Symptom	Several modules in the PMU_examples_ulib user library do not preserve the current range settings.
Resolution	This issue has been corrected.

Issue number	SCS-3883 / AR61380
Subsystem	Clarius
Symptom	For certain uncommon graph setting configurations, Clarius could hang.
Resolution	This issue has been corrected.

Issue number	SCS-3885
Subsystem	Clarius
Symptom	Clarius can hang after UTM execution if results include un-initialized data (e.g. no data returned due to an error condition).
Workaround	When writing USRLIB modules, return data should be initialized with the MEAS_NOT_PERFOFMED value of 1.0e23.
Resolution	This issue has been corrected.

Issue number	SCS-3888
Subsystem	System Monitor
Symptom	System Monitor Service keeps notifying of fan stop shutdown after 1st reboot.
Resolution	This issue has been corrected on production systems. SCS-3962 will address it for Clarius+ updates in a future release.

Issue number	SCS-3892
Subsystem	System Monitor
Symptom	System Monitor Service fails to show warning dialog ahead of emergency shutdown.
Resolution	This issue has been corrected on production systems. SCS-3962 will address it for Clarius+ updates in a future release.

Issue number	SCS-3893
Subsystem	Clarius
Symptom	Subsite output values are not shown in the subsite analyze sheet.
Resolution	This issue has been corrected.

Issue number	SCS-3907
Subsystem	Clarius
Symptom	Subsite stress allows the value of zero to be entered as the First Stress. This is an invalid value.
Resolution	This issue has been corrected.

Issue number	SCS-3911
Subsystem	Clarius
Symptom	Linked tests are not running with the displayed config settings after one of the linked tests was updated.
Resolution	This issue has been corrected.

Issue number	SCS-3912
Subsystem	Clarius
Symptom	Pulse Preview in the Advanced Terminal Settings for a PMU displays an incorrect preview with Dual Sweep option.
Resolution	This issue has been corrected.

Issue number	SCS-3923
Subsystem	Clarius
Symptom	Test library project "em-const-i" loops indefinitely when run from project level with no DUT.
Resolution	This issue has been corrected.

Issue number	SCS-3946
Subsystem	Clarius
Symptom	When selecting custom speed in a CV ITM, the A/D aperture time default value is incorrectly set to 60.
Resolution	This issue has been corrected. The default value is now set to 1.

Known problems

Issue number	SCS-24
Subsystem	Clarius
Symptom	In the Clarius subsite Stress Properties pane, in the Parameter Properties/Degradation Targets section, changes to the target checkboxes for the output values selected in tests will not cause a "Save" prompt to appear when navigating away from this screen.
Workaround	Save before navigating away from the screen.

Issue number	SCS-619
Subsystem	Clarius
Symptom	The Configure screen's All Parameter view does not include entries for the PMU's Load Line Effect Compensation and DUT Resistance options.
Workaround	Select Key Parameters pane on the Configure screen. In the right pane, select Terminal Settings, then select Advanced to open the PMU Advanced Terminal Settings dialog box, where you can enter PMU Load Line Effect Compensation and DUT Resistance values.

Issue number	SCS-3534
Subsystem	Clarius
Symptom	When copying a test from one subsite to another subsite, more rows of data may be copied than actually exist. The extra rows are copies of the last valid row.
Workaround	To keep this situation from occurring, setup the subsite and tests completely before collecting data. Â If creating a new collection of subsite tests copied from existing subsites, run from this new subsite or higher to generate a new, valid set of data.

Issue number	SCS-3574
Subsystem	Clarius+ applications, including Clarius, KCon, KXCI, KPulse, Message Console, Firmware Upgrade, and InitializeNewUser
Symptom	By default, User Account Control (UAC) notifications are disabled on the 4200A-SCS. This allows Clarius and the other Clarius+ applications noted above to make required system changes without prompting for increased privileges each time they are launched. It also allows third-party applications, including applications potentially categorized as malware, to make system changes without such prompts. You may wish to enable UAC notifications to provide an additional layer of protection when running third-party applications on the 4200A-SCS.
Workaround	You can enable UAC notifications from the User Account Control Settings in Windows. To access these settings, type "uac" in the Windows Search Bar and select **ENTER**. Raise the slider from the "Never notify" position to enable notifications. Note that the notifications will appear as prompts asking "Do you want to allow this app to make changes to your device?" each time you launch the Clarius+ applications noted above.
Issue number	SCS-3712 / AR60504
Subsystem	4200A-CVIV
Symptom	Device damage can occur when SMU is executing a range change. This is due to an SMU loop not being able to handle CVIV inductive load during one step in range change process. In such instance, SMU output can slew to power supply rail. If interlock is present, output voltage can be as high as 210V for a short time during range change. This issue affects high current ranges of the SMU, therefore it is present with or without Preamp.
Workaround	Use OVP (AVM) at a setting just above required test voltage. This will reduce likelihood of DUT damage.
Issue number	SCS-3959
Subsystem	System
Symptom	When installing Clarius+, if software dependencies are required they will be installed and may require a reboot. When prompted for a reboot, if "no" is chosen and the install is attempted again without a reboot, the installation will fail.
Workaround	Uninstall Clarius+, if necessary, and re-install, allowing reboots when requested.

Usage notes

4200A-CVIV

Before using the 4200A-CVIV Multi-Switch, be sure to connect the SMUs, using the 4200-PAs and 4200A-CVIV-SPT SMU Pass-Thru modules, and the CVU instrument cables to the 4200A-CVIV inputs.Then run the "Update Preamp, RPM, and CVIV Configuration" option in KCon. Make sure to close the Clarius application before opening KCon on the desktop. Include the action `cviv-configure` before a SMU or CVU test in the project tree to switch between I-V and C-V measurements.

4225-RPM

Before using the 4225-RPM Remote Amplifier Switch Module to switch between I-V, C-V, and Pulse ITMs, be sure to connect all instrument cables to the RPM inputs, and run the "Update Preamp, RPM, and CVIV Configuration" option in KCon. Make sure to close the Clarius application before opening KCon on the desktop.

When using the 4225-RPM in UTMs, include the call in your user module to the LPT command `rpm_config()`. The `RPM_switch` user module in the `pmuulib` User Library is deprecated. For more information, see the Help pane in Clarius.

4210-CVU

When choosing the Custom Cable Length in the CVU Connection Compensation dialog box of the Tools menu to perform open, short, and load simultaneously, you must run Measure Custom Cable Length first. Then, enable Open, Short, and Load CVU Compensation within a test.

If you are performing Open, Short, and Load CVU Compensation when the CVU is connected to the CVIV, it is recommended that you use the `cvu-cviv-comp-collect` action.

42x0 SMUs

Under certain conditions, when running SMU current sweeps at very fast ramp rates, the SMU may report compliance unexpectedly. This may occur if the sweep ramps are too high or too fast.

The workarounds for this situation are:

   a. Use the `setmode` command when generating user modules to turn off the compliance indicator value.

   With this workaround, the reading will be returned as 105% of the present range.
   b. Use smaller sweep and ramp rates (dv/dt or di/dt).
   c. Use fixed SMU ranges.

Keithley Default User Libraries

The User Libraries in Clarius+ software were compiled with Visual Studio C++. If your 4200A-SCS has a different version of Visual Studio installed (see version list below) and you wish to change or debug (using the debug task feature described in Section 8 of the *4200A-SCS Reference Manual*) any of the user libraries listed below (see Default User Libraries table), you will need to recompile all modules in that user library. You will then rebuild the user library. If you do not recompile all user modules, you will receive the error "LINK: fatal error LNK1207: incompatible PDB format in `<your usrlib>`; delete and rebuild." Follow this message or use the provided batch file, `reBuildKILibs.bat`, for this purpose. `reBuildKILibs.bat` will compile all modules and build all user libraries listed in the Default User Libraries section below. `reBuildKILibs.bat` is in `C:\S4200\sys\bin`. Earlier versions of Visual Studio may install and operate properly, but are not supported.

Versions of Visual Studio supported by Clarius+ software:

- Microsoft Visual Studio 2017 C++
- Microsoft Visual Studio 2015 C++
- Microsoft Visual Studio 2013 C++

LPTLIB

1. If a voltage limit of greater than 20 V is needed from a SMU set to force zero current, a `measv` call should be used to set the SMU to auto range to a higher range or set a higher voltage range with `rangev`.

2. If a current limit of greater than 10 mA is needed from a SMU set to force zero volts, a `measi` call should be used to set the SMU to auto range to a higher range or set a higher current range with `rangei`.

KULT

If you make changes to or need to rebuild `ki82ulib`, please note that `ki82ulib` depends on `ki590ulib` and `winulib`. You must specify these dependencies in the Options > Library Dependencies menu in KULT before building `ki82ulib`. The Options > Build Library function will fail if the dependencies are not properly selected.

KXCI

In KXCI System Mode, in both KI4200A emulation and HP4145 emulation, the following default current measurement ranges exist.

"Limited Auto – 1nA" is the default current measurement range for 4200 SMUs with preamplifiers.

"Limited Auto – 100nA" is the default current measurement range for 4200 SMUs without preamplifiers.

NOTE: If a different bottom range is needed, use the RG command to set the specified channel to a lower bottom range.

Example:

```
RG 1,1e-11
```

This will set SMU1 (with preamplifier) to the "Limited Auto - 10pA" range.

Subsite Stress Mode

In "Stress/Measure Mode," the "Leave Stress Conditions On" checkbox will maintain the stress voltage or current during the subsequent device testing. However, if the system configuration includes a matrix, then all outputs will be turned off, regardless of the checkbox, to prevent damaging matrix relays. Likewise, with a 4200A-CVIV Switch in the configuration, all outputs will be turned off if any signals are routed through the 4200A-CVIV Switch, regardless of the checkbox setting. The stress signals can be left on if they are all directly connected outside of the CVIV Switch, but they will be reset when a CVIV connection is made in the subsequent device testing to prevent damaging relays.

Windows® mapped network drive error

When installing Clarius on a PC, Microsoft® policy settings can limit Clarius from accessing mapped network drives in its file windows.

Modifying the registry will fix this issue.

To modify the registry:

1. Run `regedit`.
2. Navigate to
   `HKEY_LOCAL_MACHINE/SOFTWARE/Microsoft/Windows/CurrentVersion/Policies/System`.
3. If one does not exist, create a new `DWORD` entry named `EnableLinkedConnections`.
4. Set the value to `1`.
5. Restart the PC.

PC Installation, Help Pane PDF Link errors

When installing Clarius+ on a PC, PDF links may not open in Clarius from the help pane if you have Acrobat Reader installed and protected mode enabled.

Modifying Internet Explorer settings will fix this issue.

To modify the Internet Explorer settings:

1. Open Internet explorer.
2. Select Internet Settings.
3. On the general tab, find the Startup section, and change "Start with tabs from the last session" to "Start with home page."

Installation instructions

These directions are provided as a reference if you need to re-install Clarius+ software on your 4200A-SCS.

NOTE: All CVU Open, Short, and Load compensation constants must be re-acquired after V1.2 is installed.

STEP 1. Archive your user-modified user library data (optional)

CAUTION: Installing Clarius+ software will reinstall the `C:\4200\kiuser\usrlib`. If you made changes to the user library and do not want to lose these changes when this software is installed, copy these files to an alternate location before installation.

The easiest way to archive the user library is to copy the entire `C:\S4200\kiuser\usrlib` folder to a network drive or an archive area on the 4200A-SCS hard drive. Copy the files back after installation to restore them.

STEP 2. Install the 4200A-SCS Clarius⁺ Software Tools

If you are installing Clarius⁺ software using the supplied USB drive, follow these instructions:

1. Insert the **4200A-SCS Clarius⁺ software** USB flash drive into a 4200A-SCS USB port.
2. Double-click the **setup.exe** file on the USB drive in order to install the software on your 4200A-SCS.
3. Follow the on-screen installation instructions. If a previous version of Clarius⁺ software is installed on your 4200A-SCS, you will be asked if you want to remove it. When asked, select **OK** to continue; selecting **No** will abort the installation. If a previous version of Clarius⁺ software is uninstalled, you must restart the system and then install the new Clarius⁺ software version.
4. After the installation is complete, remove the USB flash drive and select **Yes, I want to restart my computer now** to restart the 4200A-SCS before attempting to initialize or use the software tools.

If you are downloading and installing the Clarius⁺ software from www.tek.com, follow these instructions:

1. Go to www.tek.com
2. Click the **DOWNLOADS** link.
3. From the DOWNLOAD TYPE list, choose **Software**.
4. For MODEL OR KEYWORD, type **4200A**, and click **SEARCH**.
5. Click the software link that you want to download (note that you will need to log in or register to continue).
6. Once you are logged in, click the **Download File** button and choose where to download your file (rename the file as needed).
7. Unzip the downloaded file.
8. Double-click the **setup.exe** file in order to install the software on your 4200A-SCS.
9. Follow the on-screen installation instructions. If a previous version of Clarius⁺ software is installed on your 4200A-SCS, you will be asked if you want to remove it. When asked, select **OK** to continue; selecting **No** will abort the installation. If a previous version of Clarius⁺ software is uninstalled, you must restart the system and then install the new Clarius⁺ software version.
10. After the installation is complete select **Yes, I want to restart my computer now** to restart the 4200A-SCS before attempting to initialize or use the software tools.

STEP 3. Initialize each 4200A-SCS User Account

NOTE: Each user account on the 4200A-SCS must be properly initialized before attempting to run any of the Clarius⁺ software tools. Failure to initialize may cause unpredictable behavior.

From the Windows® login screen, type the user name and password of the account to be initialized. This will need to be done for each of the two default Keithley factory accounts, and for any additional accounts added by the System Administrator. The two factory accounts are:

User name	Password
kiadmin	kiadmin1
kiuser	kiuser1

When Windows® has completed startup, select **Start** > **Keithley Instruments** > **Initialize New User**. This will initialize the user who is currently logged in.
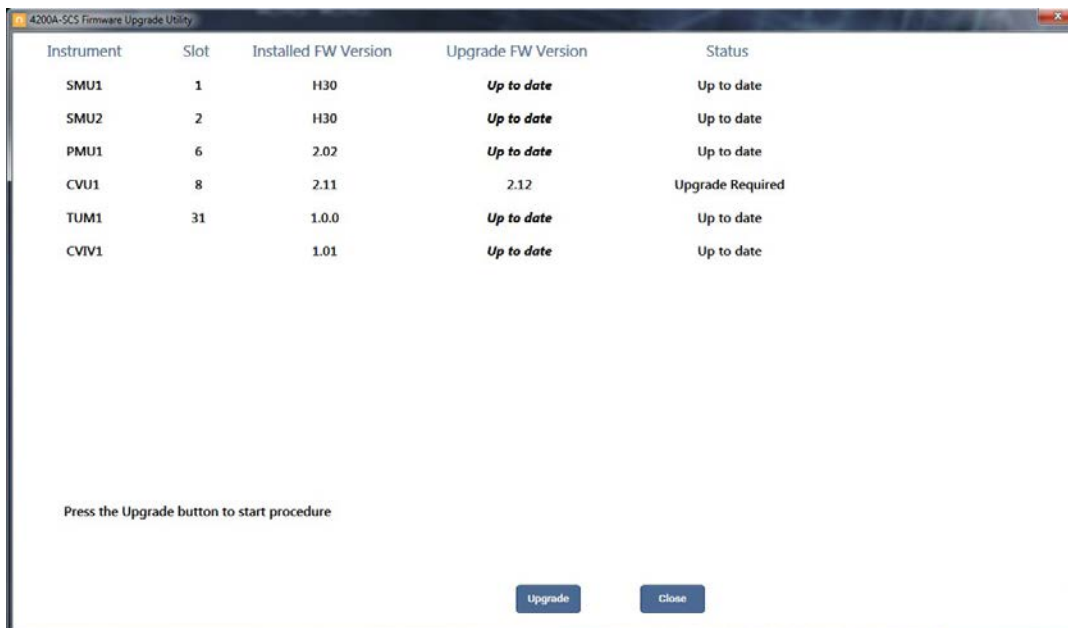
Repeat steps 1 and 2 for both Keithley accounts and for any additional accounts added by the system administrator.

STEP 4. Upgrade 42x0-SMU, 422x-PxU, 4225-RPM, 4225-RPM-LR, 4210-CVU and 4200A-CVIV Firmware

- **NOTE:** Clarius software checks for compatible instrument firmware during startup and will not run if all instruments have not been upgraded to compatible firmware versions.
- **NOTE:** To find the current hardware and firmware versions of your 4200A-SCS cards, use the KCon utility and select each card.
- **NOTE:** The firmware upgrade program will automatically indicate the hardware that needs upgraded to the approved or latest firmware version.
- **NOTE:** 4200A-SCS cards are organized by families of related models as shown in the table below. To upgrade the firmware of your 4200A-SCS cards:

CAUTION: It is strongly recommended that you connect the 4200A-SCS to an uninterruptible power supply during the firmware upgrade process. If power is lost during the firmware upgrade, the instruments may no longer be functional and will require factory servicing.

1. Exit all Clarius⁺ software programs and any other Windows® programs.
2. From the Windows® taskbar, select **Start**.
3. In the Keithley Instruments folder, select the **Firmware Upgrade** tool.
4. If your instrument needs to be upgraded, the Upgrade button becomes visible and there is an indication in Status that an Upgrade is required for a particular instrument as shown below.
5. Select **Upgrade**.

Instrument	Slot	Installed FW Version	Upgrade FW Version	Status
SMU1	1	H30	*Up to date*	Up to date
SMU2	2	H30	*Up to date*	Up to date
PMU1	6	2.02	*Up to date*	Up to date
CVU1	8	2.11	2.12	Upgrade Required
TUM1	31	1.0.0	*Up to date*	Up to date
CVIV1		1.01	*Up to date*	Up to date

Press the Upgrade button to start procedure

[Upgrade]   [Close]

Installation and firmware upgrade are now complete.

Version Table

4200A-SCS instrument family	Hardware version from KCon	Firmware version
4200-SMU/4210-SMU[1]	05,XXXXXXXX or 5,XXXXXXXX	H31
	06,XXXXXXXX or 6,XXXXXXXX	M31
4200-PA	<this product cannot be flash upgraded in the field>	–
4210-CVU	ALL (3.0, 3.1, 4.0 and later)	2.14
4220-PGU/4225-PMU[2]	1.0 and later	2.05
4225-RPM/4225-RPM-LR	1.0 and later	2.00
4200A-CVIV[3]	1.0	1.04
4200A-TUM	1.0	1.0.0

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[1] There are two different models of SMUs available in the 4200A-SCS, 4200-SMU (medium power) and 4210-SMU (high power); both models use the same firmware file.

[2] The 4225-PMU and 4220-PGU share the same pulse and source board. The 4225-PMU adds measure capability through an additional hardware board but uses the same firmware file.

[3] The 4200A-CVIV firmware contains two files to upgrade. The firmware utility will use both files in the version folder.